

We claim:

1. A filter delivery catheter, comprising:

an elongated shaft having a proximal end and a distal end;

the elongated shaft including one or more aspiration ports;

the one or more aspiration ports located circumferentially on the elongated shaft at one or more longitudinal positions proximal of the distal end; and

a blood permeable filtration device for trapping debris within the lumen of a blood vessel.
2. The filter delivery catheter of claim 1, wherein the distal end of the elongated shaft further comprises an operable end cap.
3. The filter delivery catheter of claim 2, wherein the filtration device is enclosed within the elongated shaft proximal of the operable end cap and proximate the distal end of the elongated shaft.
4. The filter delivery catheter of claim 1, wherein the one or more aspiration ports are located on the elongated shaft proximate the distal end of the elongated shaft and proximal of the filtration device.
5. The filter delivery catheter of claim 4, wherein the one or more aspiration ports are located circumferentially on the elongated shaft.
6. The filter delivery catheter of claim 4, wherein the one or more aspiration ports are located longitudinally on the elongated shaft.

7. The filter delivery catheter of claim 1, wherein the lumen of the elongated shaft fluidly couples the one or more aspiration ports to the proximal end of the elongated shaft.

8. The filter delivery catheter of claim 1, wherein the proximal end of the elongated shaft is in fluid communication with a suction providing means for extracting debris from the lumen of the blood vessel through the one or more aspiration ports.

9. The filter delivery catheter of claim 1, wherein the filtration device is located within the elongated shaft proximate the distal end of the elongated shaft.

10. The filter delivery catheter of claim 1, wherein the one or more aspiration holes are located proximate the distal end of the elongated shaft.

11. The filter delivery catheter of claim 10, wherein the one or more aspiration ports are located circumferentially and/or longitudinally on the elongated shaft.

12. The filter delivery catheter of claim 1, wherein the filtration device is a floating filter.

13. The filter delivery catheter of claim 1, wherein the filtration device is fixedly attached to a wire.

14. The filter delivery catheter of claim 1, wherein the debris includes one or more of emboli, thrombi, dislodged tissue, etc.

15. A method for extracting debris from the vasculature while delivering a blood permeable filtration device distal of a lesion, said method comprising the steps of:

providing a guide wire with a distal end and a proximal end, and placing the guide wire within the lumen of a blood vessel with said distal end positioned distal of the target site such as a stenosis or a lesion;

providing a filter delivery catheter comprising an elongated shaft having a distal end and a proximal end, the filter delivery catheter further comprising a blood permeable filtration device enclosed within the elongated shaft and proximate the distal end of said shaft, the filter delivery catheter further comprising one or more aspiration ports in a distal region proximate the distal end of the elongated shaft, said aspiration ports in fluid communication with a suction providing means fluidly connected to said proximal end of said elongated shaft;

holding the guide wire stationary and advancing the filter delivery catheter over the guide wire towards the target site, such as a stenosis or a lesion, inducing suction at the proximal end of the elongated shaft while the distal end and the distal region of the elongated shaft comprising the one or more aspiration ports traverse past the target site thereby extracting debris from the lumen of the blood vessel; and

deploying said filtration device distal of the target site, such as a stenosis or a lesion, in the lumen of the blood vessel by holding the guide wire stationary while extracting the filter delivery catheter from the lumen of the blood vessel.

16. A filter retrieval catheter, comprising:

an elongated shaft having a proximal end and a distal end, and having an inflation lumen, an aspiration lumen and a wire lumen;

a balloon disposed about a region of the elongated shaft proximate the distal end of the elongated shaft, the balloon being in fluid communication with the inflation lumen; and

a wire disposed in the wire lumen and having a blood permeable filtration device disposed thereon.

17. The filter retrieval catheter of claim 16 wherein the wire lumen is fluidly coupled to the distal end of the aspiration lumen.

18. The filter retrieval catheter of claim 17, wherein the aspiration lumen is in fluid communication with a suction providing means for extracting debris through the fluidly coupled aspiration and guide wire lumens.

19. The filter retrieval catheter of claim 16, wherein the aspiration lumen is in fluid communication with a suction providing means for extracting debris through the aspiration lumen.

20. A method for retrieving a debris laden blood permeable filtration device from within the vasculature, said method comprising the steps of:

providing a filter retrieval catheter comprising an elongated shaft with an aspiration lumen therethrough and having a proximal end and a distal end, the filter retrieval catheter further comprising a wire lumen having a proximal end and a distal end, the proximal end of said wire lumen fixedly attached, at least in part, to the distal end of said elongated shaft and fluidly coupling the distal end of the aspiration lumen to the wire lumen while maintaining fluid communication between the lumen of the blood vessel and through the wire lumen;

disposing a wire through the wire lumen of the filter retrieval catheter, positioning said retrieval catheter within the lumen of the blood vessel proximate proximal side of the emboli laden blood permeable filtration device;

applying suction at the proximal end of the filter retrieval catheter thereby extracting debris trapped within the filtration device; and

collapsing the filtration device into a low profile state around the distal end of the aspirating filter retrieval catheter, and extracting said filtration device with said filter retrieval catheter from the lumen of the blood vessel.